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KEY TO THE BINDWEEDS (*CALYSTEGIA* AND *CONVOLVULUS*, CONVOLVULACEAE) OF ALABAMA AND ADJACENT STATES

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ABSTRACT

Bindweeds are members of the Convolvulaceae (Morning-glory family) and are represented by two closely-related genera: *Calystegia* and *Convolvulus*. In North America, the genus *Calystegia* includes 41 taxa (19 species; 33 subspecies), three of which are known from Alabama, with an additional five taxa occurring either in Mississippi, Tennessee, Georgia, and/or Florida. The genus *Convolvulus* includes eight North American species with two found in the same five-state region. Two of these bindweed species, *Calystegia pubescens* and *Convolvulus arvensis*, are exotic to North America. One species, *Convolvulus equitans*, is known from only a single historical Alabama collection and is considered to have been an adventive waif from southwestern USA and Mexico.

KEY WORDS: *Calystegia, Convolvulus*, bindweed, Alabama

Bindweeds are perennial herbs with stems that frequently climb and/or twist, hence the common name. Not all bindweeds are climbers; some are erect (e.g., *Calystegia spithamaea*) and others tend to be more or less prostrate on the ground (e.g., *Convolvulus arvensis*). *Calystegia* and *Convolvulus* are both in the Morning-glory family (Convolvulaceae). Taxonomically, all bindweeds were originally placed in the genus *Convolvulus* by Linnaeus (1753), who named them after the Latin word *convolve*, "to twine around." Later, Robert Brown (1810) separated *Calystegia* from *Convolvulus* based on the large bracts that often conceal the sepals (Fig. 1). His new name was of Greek derivation and translates to "calyx covering."

(a) Photo: John Gwaltney

(b) Photo: John Gwaltney

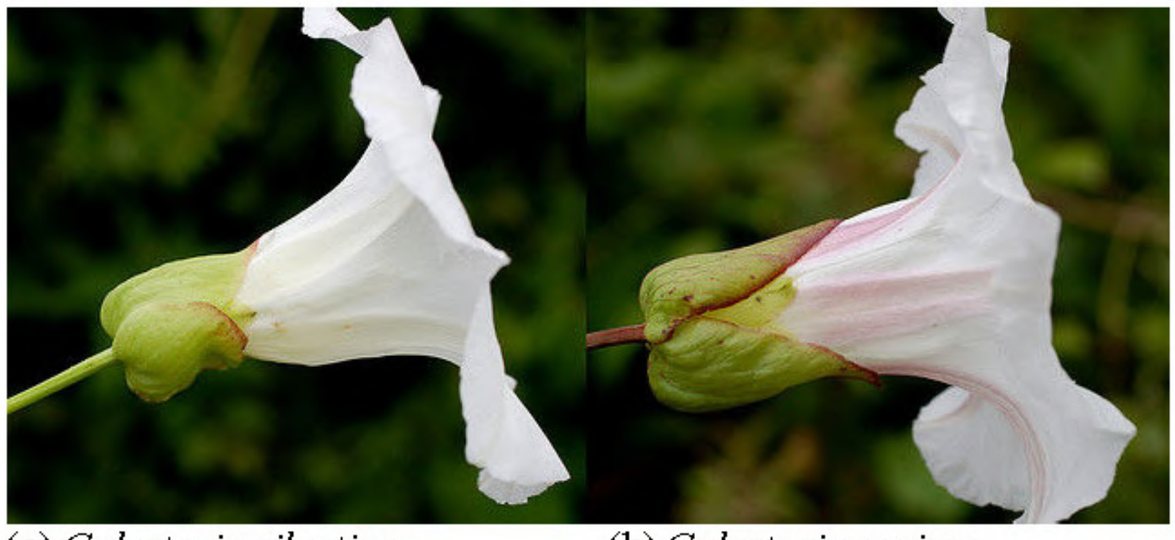
Figure 1. (a) Large bracts of *Calystegia catesbeiana* subsp. *catesbeiana* almost hide sepals; 20 April 2007, Tishomingo Co., Mississippi. (b) Small bracts of *Convolvulus arvensis* are found well below flower; 12 July 2011, Washington Co., Mississippi. <www.southeasternflora.com>

Asa Gray (1876, p. 89) questioned the separation and stated "that the characters of *Calystegia* are too artificial, and may now be added too transitional, to warrant the adoption of the genus." Further research by Hallier (1893), O'Donell (1959), and Walter and Oliver (1965) investigated other

character differences such as locule number, stigma shape, and pollen morphology. They discovered that *Calystegia* species consistently have bilocular ovaries, swollen stigmas, and pollen grains with numerous round pores (pantoporate pollen), whereas *Convolvulus* sensu stricto have unilocular ovaries, filiform stigma lobes, and pollen grains that are three-grooved (tricolpate pollen).

In spite of accumulating morphological evidence, most American taxonomists continued to lump *Calystegia* under *Convolvulus* (Wilson 1960). This was reflected in North American plant manuals such as Britton (1901), Small (1913, 1933), Fernald (1950), Gleason (1952), Munz (1959), Gleason & Cronquist (1963), and Steyermark (1963). The recognition of *Calystegia* as a distinct genus was not widely accepted until Richard K. Brummitt completed a revision of the genus for his doctoral thesis (Brummitt 1963) and subsequently published his new combinations (Brummitt 1965). One of the first American floras to use *Calystegia* was the Guide to the Vascular Flora of the Carolinas (Radford et al. 1964).

The trend had shifted in the United States during the 1960's and a majority of botanists began to acknowledge *Calystegia* as a valid genus. Nevertheless, problems arose in the identification of many of the new taxa that were being named, especially within the *Calystegia* [*Convolvulus*] *sepium* complex. Brummitt (1965, 1980) created several new subspecies in this group and even recognized one as a distinct species based on strongly overlapping obtuse bracts (Fig. 2), but he did not provide a key for any of the new combinations.



(a) *Calystegia silvatica* (b) *Calystegia sepium*

Figure 2. Photos by Bob Osborne, 12 June 2009, Suffolk, England. (a) Bracts of *C. silvatica* distinctly overlap and conceal the majority of the sepals. (b) Bracts in *C. sepium* only overlap at base and sepals are easily visible.

Brummitt (1965, p. 214) stated in his first paper that "descriptions of new taxa will be published in a full revision of the whole genus." Fifteen years later, in his second publication of new names, Brummitt (1980, p. 327) again promised a revision of the genus and said that it was "expected to be published very shortly after the present paper." He never released his new revision, however, and botanists continued to struggle in sorting out the taxa. Fortunately, Dr. Brummitt has contributed the treatment of *Calystegia* for Flora of North America (FNA) and finally got to finish the work he had started long ago. Sadly, he passed away on September 18, 2013, before he got to see his *magnum opus* published.

Despite the current recognition of *Calystegia,* the debate over the generic boundaries between *Calystegia* and *Convolvulus* continues. Recent molecular evidence (Carine et al. 2004) suggests a very close relationship between the two genera and Stefanović et al. (2002) found that *Calystegia* is nested within *Convolvulus* and concluded that *Convolvulus* should include both. However, Brummitt (1997, 2002) has defended paraphyletic taxa and resisted the attempts to sink *Calystegia* back into *Convolvulus*. Brummitt and Sosef (1998) believed paraphyletic taxa were logically required under traditional Linnaean taxonomy. In this present paper, I have opted to retain *Calystegia* as distinct.

The keys that follow were constructed after examining specimens from herbaria across the South (ALNHS, AMAL, AUA, BRIT, JSU, UNA, VDB). Many North American treatments of the genera were utilized to assist in creating keys and determining distributions. Publications used as references include the following: *Calystegia* (Convolvulaceae) in Texas (Austin et al. 1997); Guide to the Vascular Plants of the Florida Panhandle (Clewell 1985); Shinners & Mahler's Flora of North Central Texas (Diggs et al. 1999); Flora Novae Angliae (Haines 2011); Floristic Synthesis of North America (BONAP 2013); Alabama Plant Atlas (Kral et al. 2013); Manual of the Vascular Flora of the Carolinas (Radford et al. 1968); Manual of the Southeastern Flora (Small 1933); Keys to the Flora of Arkansas (Smith 1994); The varieties of *Convolvulus spithamaeus* and of *C. sepium* (Tryon 1939); Flora of Virginia (Weakley et al. 2012); Flora of the Southern and Mid-Atlantic States (Weakley 2013); Our Dwarf Bindweeds (Wherry 1957); Guide to the Vascular Plants of Florida (Wunderlin & Hansen 2003); and Steyermark's Flora of Missouri, Volume 2 (Yatskievych 2006).

Information on taxa is generally set up in the following format: **Number. Name** author(s) {derivation of specific and infraspecific epithets}. VERNACULAR NAME. Habitat; relative abundance; flowering dates. Comments. [*Synonyms*].

KEY TO BINDWEEDS OF ALABAMA AND ADJACENT STATES

1. Calyx not concealed by bracts; corollas less than 3 cm long.

    2. Calyx 6–12 cm long and densely pubescent; corolla margins with 5 sharp-pointed projections (corolla star-shaped); plants densely gray-pubescent; leaf blades entire, toothed or deeply lobed ..... **10. Convolvulus equitans**
    2. Calyx smaller, 3–5 cm long, and sparsely pubescent to glabrous; corolla margins lacking sharp points (merely 5-angled); plants pubescent to glabrate; leaf blades entire except for basal lobes ..... **9. Convolvulus arvensis**

1. Calyx concealed by 2 large bracts; corollas larger, more than 3 cm long.

    3. Flowers double; corolla deeply divided into many parts; stamens lacking; flowers usually pink; stems pubescent; exotic and rare escape from cultivation..... **4. Calystegia pubescens**
    3. Flowers not double; corolla entire; stamens present; flowers white or pink; stems pubescent or glabrous; native.

        4. Stems completely erect, not twining (plants do not climb, but tip may be flexuous); uppermost leaves obviously over-topping stem apex (usually by more than 2 cm) ..... **1. Calystegia spithamaea** subsp. **spithamaea**
        4. Stems twining or trailing and twining at tip (plants are climbers, but lower portion may be semi-erect); uppermost leaves not noticeably over-topping stem apex (immature leaves may slightly surpass tip but by much less than 1 cm).

            5. Leaves ovate-elliptic (lower portion of blade about as wide as lobes); basal leaf lobes broadly rounded and entire (not notched or toothed); undersurface of leaves soft pubescent; flowers borne mostly from lower or median axils; stems trailing and twining near tip or completely twining.

                6. Leaf undersurface obscured by hairs (densely white or brownish-white tomentose and blade tissue not visible); plants robust, stems strongly twisting and climbing up to 2 meters or more; restricted to the Blue Ridge of Georgia, South Carolina and North Carolina ..... **3. Calystegia catesbeiana** subsp. **sericata**

6. Leaf undersurface not completely obscured by hairs (often velvety, but greenish because the blade tissue is easily seen between hairs); plants smaller, stems weakly twisting and climbing, usually less than 1 meter; found throughout the southeast .....**2. Calystegia catesbeiana** subsp. **catesbeiana**

5. Leaves triangular (lower portion of blade often narrower than lobes); basal leaf lobes sometimes rounded or more often pointed with 1–3 acute angles (appearing notched or toothed); undersurface of leaves pubescent or glabrous; flowers borne from middle and upper axils; stems twining throughout.

7. Margins of bracts overlapping at least half their length; bracts inflated (saccate) at base and apex usually obtuse; plants typically glabrous (rarely pubescent); basal leaf sinus broad and usually squared-off (quadrate) with 2 parallel sides that are often at right angles to the base (but not always); flowers occasionally in pairs in axils .....**8. Calystegia silvatica** subsp. **fraterniflora**

7. Margins of bracts (on mature flowers) scarcely overlapping or overlapping only at the base; bracts flat (also keeled, but rarely scarcely saccate) and apex often acute; leaf sinuses mostly acute or rounded (V or U-shaped); flowers always solitary from axils.

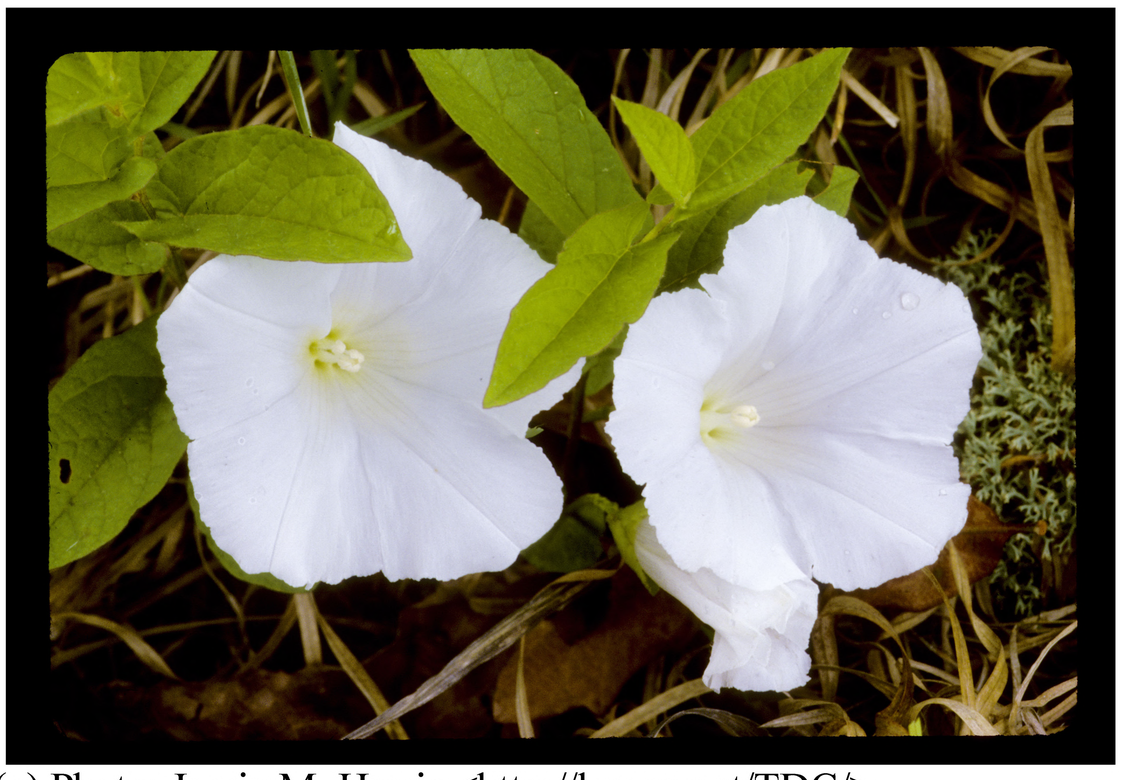
8. Plants typically short-pubescent; basal leaf lobes rounded with an acute point and entire (rarely slightly notched); leaves narrowly to broadly triangular or linear; corolla white; plants of the lower Coastal Plain from North Carolina, south to Florida and west to Texas [disjunct in California and Mexico]
7. Calystegia sepium subsp. **limnophila**

8. Plants essentially glabrous; basal leaf lobes often with 2–3 acute angles (appearing notched or toothed); leaves broadly triangular; flowers white or pink; plants of the mountains or upper Coastal Plain and west through the Great Plains.

9. Corolla pink; bracts mostly 14–26 mm wide and overlapping at base; plants of the Appalachians from northeast Tennessee northward to New England and Canada .....**6. Calystegia sepium** subsp. **appalachiana**

9. Corolla white; bracts mostly 10–18 mm wide and barely overlapping at base, if at all; plants of northern USA and Canada; from Vermont south to Kentucky and western Tennessee and out through the Great Plains and Rocky Mountains .....**5. Calystegia sepium** subsp. **angulata**

1. Calystegia spithamaea (Linnaeus) Pursh subsp. **spithamaea** {a span high} — UPRIGHT BINDWEED; LOW FALSE BINDWEED; LOW BINDWEED (Fig. 3). This species was erroneously reported for Alabama (Kral et al. 2011). Upright Bindweed grows in grasslands and open woods from Maine to southern Minnesota, south to Missouri and east to North Carolina. In Tennessee it is rare and known only from Clay and Knox counties. Most specimens identified as this taxon were annotated by the author to *Calystegia catesbeiana* subsp. *catesbeiana*, which twines at least at the tip. *Calystegia spithamaea* is completely erect and does not climb at all. These two plants are often confused because they both have flowers in the lower axils and bloom in the spring. Two other subspecies occur in the eastern USA (Wherry 1957): subsp. *purshiana* (Wherry) Brummitt is found in shale barrens of the middle Appalachian Mountains from southern New York to Virginia, and subsp. *stans* (Michaux) Brummitt is typically found in dry coniferous or birch woodlands of southeastern Canada and Minnesota south to Michigan and New York. These two taxa have leaves that are velvety-tomentose and leaf bases that usually clasp the stem. The foliage of subsp. *spithamaea* is almost glabrous to pubescent (but not tomentose) and lobes are typically small and rarely clasp the stem. [*Convolvulus spithamaeus* Linnaeus].



(a) Photo: Jessie M. Harris <http://bonap.net/TDC/>

(b) Herbarium specimen (VDB)

Figure 3. *Calystegia spithamaea* subsp. *spithamaea*. (a) Flowering specimen showing erect stems and upper leaves surpassing growing tip. (b) Collection by Robert Kral #80524, 14 May 1992, Clay Co., Tennessee.

2. Calystegia catesbeiana Pursh subsp. **catesbeiana** {for botanist Mark Catesby, 1679–1749} — CATESBY'S BINDWEED; CATESBY'S FALSE BINDWEED (Fig. 1a & 4). Roadsides, fields, streambanks, woodland borders, mixed woods, pine forests, and slopes; common throughout Alabama; late March–June. This taxon is the most common of the three *Calystegia* in Alabama. It flowers earlier than the other two species in the state (*C. silvatica*, *C. sepium*) and can be identified by its velvety leaves, flowers arising from lower axils, and stems that often twine only at the tip. The other subspecies, subsp. *sericata*, differs from subsp. *catesbeiana* by its larger and densely tomentose leaves. Catesby's Bindweed is also often misidentified as *Calystegia spithamaea*, which is an erect plant with leaves that obviously overtop the apex of stem. *Calystegia catesbeiana* is a climbing vine that twines (at least at tip) and its upper leaves rarely overtop the apex of stem. [*Calystegia spithamaea* (Linnaeus) Pursh var. *pubescens* (Gray) C.F. Reed; *Convolvulus sepium* (Linnaeus) R. Brown var. *catesbeiana* (Pursh) Fernald; *Convolvulus spithamaeus* Linnaeus subsp. *catesbeianus* (Pursh) Wherry; *Convolvulus spithamaeus* Linnaeus var. *catesbeianus* (Pursh) Tryon; *Convolvulus spithamaea* Linnaeus var. *pubescens* (Gray) Fernald]

(a) Photo: Dan Spaulding

(b) Herbarium specimen (AMAL)

(c) Photo: John Gwaltney

Figure 4. *Calystegia catesbeiana* subsp. *catesbeiana*. (a) Habit showing twining tip; 19 April 2012, Cherokee Co, Alabama. (b) Collection by Ruth Ann Edge *s.n.*, 28 April 1989, Limestone Co., Alabama. Note flowers in lower axils. (c) Undersurface of leaf revealing pubescence; 20 April 2007, Tishomingo Co, Mississippi.

3. Calystegia catesbeiana Pursh subsp. **sericata** (House) Brummitt {silky} — BLUE RIDGE BINDWEED; DOWNY FALSE BINDWEED; SILKY BINDWEED (Fig. 5). This taxon has not been collected in Alabama. All specimens identified as "*Calystegia sericata*" were annotated to subspecies *catesbeiana*. Blue Ridge Bindweed is found in the mountains of Georgia, South Carolina, and North Carolina. It flowers late May through July along woodland borders and other open places. Subspecies *sericata* is more robust than subsp. *catesbeiana* and has leaves so densely tomentose that the hairs conceal the undersurface. [*Calystegia sericata* (House) Bell; *Convolvulus sericatus* House]

(a) Photo: Bill Moye

(b) Photo: Janie K. Marlow

(c) Herbarium specimen (UNA)

Figure 5. *Calystegia catesbeiana* subsp. *sericata.* (a) Front and side view of flowers; May 1991, Rutherford Co., North Carolina. (b) Close-up of flower bud and portion of leaf showing dense pubescence; April 2012, Pickens Co., South Carolina. (c) Collection by S.W. Leonard #4811, 21 May 1971, Oconee Co., South Carolina.

4. Calystegia pubescens Lindley {pubescent} — HAIRY BINDWEED; JAPANESE BINDWEED; HAIRY FALSE BINDWEED (Fig. 6). This species has not been collected in Alabama but has escaped to waste places in Washington County of northeast Tennessee (BONAP 2013). Native to China, Korea, and Japan, the single-flowered plant has only been collected once in the wild from wool mills in Massachusetts (Fernald 1949). The doubled-flowered form is sterile and produces no seed, thus spreading by fragmentation of its slender rhizomes (Fernald 1949). Hairy Bindweed is most commonly found in northeastern USA but also occurs in other northern states (BONAP 2013). [*Calystegia hederacea* auct. non Wallich; *Calystegia japonica* Choisy; *Calystegia pellita* auct. non Ledebour; *Convolvulus* japonicus auct. non Thunberg; *Convolvulus pellitus* Ledebour; *Convolvulus pubescens* (Lindley) Thellung nom. illegit., non Willdenow]

(a) Photo: Teresa Rivière

GEORGE SAFFORD TORREY HERBARIUM
CONN
DEPARTMENT OF ECOLOGY & EVOLUTIONARY BIOLOGY
UNIVERSITY OF CONNECTICUT
(Specimen imaging made possible with a grant from the National Science Foundation.)

(b) Herbarium specimen (CONN)

Figure 6. *Calystegia pubescens.* (a) In cultivation; 24 August 2010. (b) Collection by Mary M. Hubbard *s.n.*, 31 July 1948, Windham Co., Connecticut. <http://bgbaseserver.eeb.uconn.edu/>

5. Calystegia sepium (Linnaeus) R. Brown subsp. **angulata** Brummitt {of hedges; angled} — TRAILING BINDWEED; ANGLED FALSE BINDWEED (Fig. 7). This taxon has been erroneously reported for Alabama (Kral et al. 2011). Its distribution is from the northern Pacific states, east through the Great Plains and sparingly in the northeast (Brummitt 1980). It grows along riverbanks, hedges, roadsides, and waste places. This taxon has been documented from Obion County in western Tennessee (BONAP 2013). It differs from subsp. *appalachiana* by its white flowers and slightly smaller bracts that are not as strongly keeled and rarely overlap at the base. Both of these subspecies are glabrous, whereas *Calystegia sepium* subsp. *limnophila* is pubescent. [*Calystegia sepium* (Linnaeus) R. Brown var. *angulata* (Brummitt) N. Holmgren; *Convolvulus sepium* (Linnaeus) R. Brown var. *repens* (L.) Gray; *Convolvulus repens* Linnaeus]

(a) Photo: Jeff Hansen (b) Photo: Jeff Hansen

Figure 7. *Calystegia sepium* subsp. *angulata* in Kansas. <http://www.kansasnativeplants.com/guide/index.php> (a) Front view of flower. (b) Side view of flower showing bracts with bases that don't overlap.

6. Calystegia sepium (Linnaeus) R. Brown subsp. **appalachiana** Brummitt {Appalachian} — APPALACHIAN BINDWEED; APPALACHIAN FALSE BINDWEED (Fig. 8). There are no reports of this species from Alabama. The southern part of its range appears to be northeastern Tennessee (pers. comm. Dwayne Estes) and its distribution extends northward into Canada. Found along roadsides, hedges, and waste areas, it is very similar to *Calystegia sepium* subsp. *angulata* but has pink flowers and typically larger bracts, which are very strongly keeled and distinctly overlap at the base.

(a) Photo: Janie K. Marlow (b) Photo: Janie K. Marlow

Figure 8. *Calystegia sepium* subsp. *appalachiana* photographed on the Blue Ridge Parkway, July 2009, Buncombe Co., North Carolina. (a) Close-up of pink flowers revealing strongly keeled bracts with overlapping bases. (b) Pinkish flowers and glabrous leaves with notched lobes.

7. Calystegia sepium (Linnaeus) R. Brown subsp. **limnophila** (Greene) Brummitt {marsh lover} — MARSH BINDWEED; MARSH FALSE BINDWEED (Fig. 9). Wet pine savannahs, salt marshes and other wetlands; frequent on the lower Coastal Plain; May–August (Florida, Feb–Nov). This taxon is the only subspecies of *Calystegia sepium* known from Alabama (Baldwin and Mobile counties). Kral et al. (2011) reported three other subspecies in the state, but this was in error. Subsp. *limnophila* is usually found in wetter habitats near the coast in the southeastern USA, from North Carolina to Texas with disjunct populations further west (BONAP 2013). The key characters of this taxon in Alabama are its long twining stems, flowers from many axils, and pubescent leaves. Tryon (1939) recognized the linear leaf form as f. *nashii,* but Brummitt (1965) did not give it taxonomic recognition because it intergrades with broader leaved plants. Most of the other *Calystegia* from Alabama are often lumped under *Calystegia sepium* or are misidentified as that species. [*Convolvulus limnophilus* Greene; *Convolvulus nashii* House; *Convolvulus sepium* Linnaeus f. *nashii* (House) Tyron]

(a) Photo: Dennis Girard (b) Photo: Wayne Matchett (c) Photo: Howard Horne

Figure 9. *Calystegia sepium* subsp. *limnophila.* (a) Habit in Florida. (b) Close-up of bracts and leaves. (c) Growing on *Phragmites* next to salt marsh, 17 October 2013, Mobile Co., Alabama.

Below is a key to the *Calystegia sepium* complex.

A. Bracts intergrading into sepals in one series, the flower seen from the side appearing to have 3 or 4 bracts; leaf sinus narrow and almost closed; corolla pink {northern USA and adjacent Canada, Illinois west to New York} .....*C. sepium* subsp. *erratica* Brummitt

A. Bracts clearly only 2; leaf sinus open; corolla white or pink.

B. Margins of bracts overlapping at least half their length; leaf sinus broad and often almost square (quadrate); bracts inflated (saccate) at base with apex mostly obtuse; flowers occasionally in pairs in axils.....*C. silvatica* subsp. *fraterniflora*

B. Margins of bracts scarcely overlapping or overlapping only at base; leaf sinus acute to rounded; bracts mostly flat (and keeled) with apex usually acute; flowers always solitary from axils.

C. Flowers smaller, corolla 35–50 mm long; stamens 17–25 mm; leaf sinus acute (V-shaped); corolla white; plant glabrous {European, uncommon in the USA; of waste places in New England, New York, Pennsylvania and Canada} .....*C. sepium* subsp. *sepium*

C. Flowers larger, corolla 48–70 mm long; stamens 25–32 mm; leaf sinus acute or rounded (U-shaped); corolla white or pink; plant glabrous or pubescent.

D. Plants typically pubescent; basal leaf lobes rounded with an acute point and entire or only slightly notched.

E. Leaves narrowly triangular to linear; sinuses mostly rounded; corolla white {lower Coastal Plain from North Carolina, south to Florida and west to Texas; disjunct in California and Mexico} ..... *C. sepium* subsp. *limnophila*

E.. Leaves broadly triangular; sinuses acute (V-shaped); corolla pink {along the Northern Atlantic coasts from North Carolina to Canada and near waters of Lake Champlain and Great Lakes of northern USA and Canada}
.....*C. sepium* subsp. *americana* (Sims) Brummitt

D. Plants essentially glabrous; basal leaf lobes often with 2−3 acute angles (appearing notched or toothed).

F. Corolla pink; bracts mostly 14−26 mm wide and overlapping at base {Appalachians, from northeast Tennessee north to New England and Canada}
.....*C. sepium* subsp. *appalachiana*

F. Corolla white; bracts mostly 10−18 mm wide and barely overlapping at base, if at all {northern USA and Canada; from Vermont south to Kentucky and western Tennessee and out through the Great Plains and Rocky Mountains}
..... *C. sepium* subsp. *angulata*

8. Calystegia silvatica (Kitaibel) Grisebach subsp. **fraterniflora** (Mackenzie & Bush) Brummitt {of the woods; with brotherly flowers} — TWIN-FLOWERED BINDWEED; SHORT-STALK FALSE BINDWEED (Fig. 10). Streambanks, lake margins, fields, roadside ditches, railroad tracks and other waste places; frequent in the Appalachian Highlands, infrequent on the Coastal Plain; late May−October. This taxon occurs in eastern and midwestern USA from Iowa to Massachusetts south to Georgia and west to Arkansas. Kral et al. (2011) did not list it for Alabama. *Calystegia silvatica* subsp. *fraterniflora* has inflated bracts with margins that overlap at least half their length and leaves with broad sinuses that almost form a square, rather than the typical V or U-shaped sinuses of *Calystegia sepium*. Another noticeable character is the leaf blade tissue tapers down the petiole to form a small acute point and sometimes creates a "w" that looks like a pair of smaller sinuses (best seen on herbarium specimens). Its leaves tend to be mostly glabrous in the Southeast, but they are occasionally pubescent in other states. The flowers are typically white, but they are occasionally tinged with pink. Another subspecies, *Calystegia silvatica* subsp. *disjuncta* Brummitt, Large Bindweed, is an exotic, aggressive weed that has invaded the west coast. It is similar to subspecies *fraterniflora* but has a rounded sinus and leaves that are broadly triangular or ovate-elliptic. [*Calystegia fraterniflora* (Mackenzie & Bush) Brummitt; *Convolvulus fraterniflorus* (Mackenzie & Bush) Mackenzie & Bush; *Convolvulus sepium* Linnaeus var. *fraterniflorus* Mackenzie & Bush]

(a) Photo: Dan Spaulding (b) Photo: Wayne Barger (c) Photo: Wayne Barger

Figure 10. *Calystegia silvatica* subsp. *fraterniflora.* (a) Flowering along a creek bank, 6 September 2013, Calhoun Co., Alabama. (b) Flower showing saccate bracts with overlapping margins, 24 July 2013, Perry Co., Alabama. (c) Close-up of leaf with quadrate sinus, 3 July 2007, Jackson Co., Alabama.

9. Convolvulus arvensis Linnaeus {of fields} — FIELD BINDWEED; CREEPING-JENNY; POSSESSION-VINE; CORNBIND (Fig. 1b & 11). Railroad tracks, disturbed areas and waste places; infrequent; throughout Alabama; May–November. Flowers of this species are white to pink. Field Bindweed is adventive from Europe and is a serious weed in temperate regions throughout the world (Degennaro and Weller 1984). Its extensive perennial root system makes it difficult to control and it easily spreads by rhizome fragments (Walker and Riley 1982). *Convolvulus arvensis* is found in every state in the USA but is more abundant out west (BONAP 2013). [*Strophocaulos arvensis* (Linnaeus) Small]

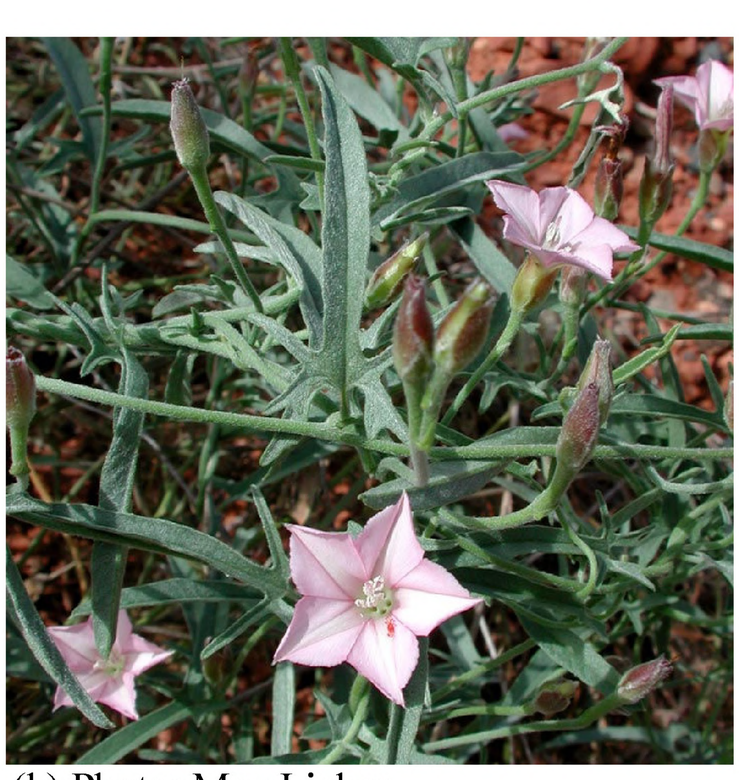
(a) Photo: Wayne Barger

(b) Photo: Wayne Barger

Figure 11. *Convolvulus arvensis* along a roadside in Colbert Co., Alabama, 24 April 2012. (a) Prostrate habit. (b) Close-up of flowers and leaves.

10. Convolvulus equitans Bentham {riding a horse, overlapping in two ranks} — TEXAS BINDWEED; GRAY BINDWEED; SILVER BINDWEED; HOARY BINDWEED (Fig. 12). There is only one historic collection known from Alabama (none from adjacent states). The collection was made by Charles Mohr in 1883 from Mobile County. He stated that it was "in an oat field, most probably introduced from Texas with seed oats" (Mohr 1901). This species is native to southwestern USA and adjacent Mexico, inhabiting prairies, roadsides and other disturbed areas. It differs from *Convolvulus arvensis* by its hoary pubescence, "star-shaped" corollas and leaves that are often multi-lobed or toothed. [*Convolvulus hermannioides* Gray; *Convolvulus incanus* auct. non Vahl]

(a) Photo: Max Licher



(b) Photo: Max Licher

Figure 12. *Convolvulus equitans* growing near the City of Cottonwood, Kaufman Co., Texas. (a) Habit on the ground. (b) Close-up of flowers and leaves. <http://swbiodiversity.org/seinet/taxa/index.php?taxon=3920>

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